AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Claim 1 (currently amended): A <u>computer implemented</u> method for compressing <u>a file of</u> an animation model <u>for an animation cycle comprising a plurality of frames of animation of the animation model</u>, the model comprising an offset model including a plurality of surfaces, each surface including a plurality of vertices, the method comprising:

predicting offset vertices of the offset model for corresponding reference vertices of a reference model <u>for a first frame of the animation cycle and</u> associated with the offset model, using basis coordinate systems respectively associated with the reference vertices;

determining differences between the predicted offset vertices and actual offset vertices of the offset model <u>for each subsequent frame of the animation cycle</u>; and

storing <u>as a compressed file in a database</u> the <u>reference model and</u> differences between the predicted offset vertices and actual offset vertices to allow reconstruction of the actual offset vertices using the reference vertices and the differences <u>for each subsequent frame of the animation cycle</u>.

Claim 2 (original): The method of claim 1, wherein at least one basis coordinate system comprises a set of vertices that are either seed vertices or vertices previously traversed.

Claim 3 (original): The method of claim 1, wherein at least one basis coordinate system is a triangle defined by three vertices nearby the reference vertex.

Claim 4 (original): The method of claim 1, wherein at least one basis coordinate system comprises a preconfigured triangle based on a location of the reference vertex.

Claim 5 (original): The method of claim 1, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i,k-1}$, $P_{i+1,k-1}$, $P_{i+1,k-2}$ where the reference vertex is $P_{i,k}$, and is in an odd row of the surface.

Claim 6 (original): The method of claim 1, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i,k-1}$, $P_{i,k-2}$, where the reference vertex is $P_{i,k}$, and is in an even row of the surface.

Claim 7 (original): The method of claim 1, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i-1,k}$, $P_{i-2,k}$, where the reference vertex is $P_{i,k}$, and is in a last row of the surface.

Claim 8 (original): The method of claim 1, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k}$, $P_{i,k+1}$, $P_{i-2,k+1}$, where the reference vertex is $P_{i,k}$, and is the leftmost vertex in a last and odd row of the surface.

Claim 9 (original): The method of claim 1, wherein predicting offset vertices comprises for each offset vertex:

selecting a reference vertex on the reference model and a corresponding offset vertex;

selecting a basis coordinate system on the reference model with respect to the reference vertex, the basis coordinate system defined by vertices nearby the reference vertex, the basis coordinate system providing the basis coordinates for the reference vertex;

selecting a basis coordinate system on the offset model;

determining a position of the reference vertex in the basis coordinate system; and

predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model.

Claim 10 (original): The method of claim 9, wherein selecting a reference vertex on the reference model comprises traversing the surface of the reference model in a zig-zag pattern.

Claim 11 (original): The method of claim 9, wherein predicting the offset vertex comprises:

determining a reference vector for the position of the reference vertex in the basis coordinate system on the reference model; and

determining a corresponding offset vector for the reference vertex in the basis coordinate system of the offset model.

Claim 12 (original): The method of claim 9, wherein predicting the offset vertex comprises determining the offset vertex $P'_{i,k}$ from the equation:

$$\vec{P'}_{i,k} = \left(\vec{P}_{i,k} - \vec{A}\right) * \begin{bmatrix} \vec{s} \\ \vec{t} \\ \vec{r} \end{bmatrix}^{-1} \begin{bmatrix} \vec{s}' \\ \vec{t}' \\ \vec{r}' \end{bmatrix} + \vec{A}'$$

where:

$P_{i,k}$ is the reference vertex in the world space of the reference model;

A, B, C are vertices of the basis coordinate system in the world space of the reference model, and

s=B-A, t=C-A, and r is normal to s and t, and has a length equal to the average length of s and t;

A', B', C' are vertices of the basis coordinate system in the world space of the offset model, and

s'=B'-A', t'=C'-A', and r' is normal to s' and t', and has a length equal to the average length of s' and t'.

Claim 13 (original): The method of claim 1, further comprising:

selecting seed vertices; and

quantizing the seed vertices.

Claim 14 (original): The method of claim 1, wherein predicting offset vertices comprises traversing the surface of the reference model in a zig-zag pattern.

Claim 15 (original): The method of claim 1, wherein predicting offset vertices comprises traversing the surface of the reference model in a hierarchical traversal pattern.

Claim 16 (original): The method of claim 1, wherein predicting offset vertices comprises traversing the surface of the reference model in a triangle-based traversal pattern.

Claim 17 (original): The method of claim 1, further comprising quantizing the differences.

Claim 18 (original): The method of claim 1, wherein each difference comprises a vector having vector components, each vector component associated with an axis of a coordinate system, further comprising:

reordering vector components of the difference so that vector components associated with each axis are stored contiguously.

Claim 19 (original): The method of claim 1, wherein storing the differences comprises compressing the differences into a compressed data set using an entropy based compression algorithm.

Claim 20 (original): The method of claim 1, further comprising compressing seed vertices using an entropy based compression algorithm.

Claim 21 (currently amended): A <u>computer implemented</u> method for compressing <u>a file of</u> an animation model, the model comprising an offset model including a plurality of surfaces, each surface including a plurality of vertices, the method comprising:

traversing a plurality of reference vertices on a surface of <u>a</u> reference model <u>for a first frame of the animation cycle and</u> associated with the offset model, and for each reference vertex:

selecting an offset vertex of the offset model corresponding to the reference vertex;

selecting a basis coordinate system on the reference model with respect to the reference vertex, the basis coordinate system defined by vertices nearby the reference vertex, the basis coordinate system providing the basis coordinates for the reference vertex;

selecting a basis coordinate system on the offset model;

determining a position of the reference vertex in the basis coordinate system on the reference model; and

predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model;

determining a difference between the predicted offset vertex and an actual offset vertex of the offset model <u>for each subsequent frame of the animation model</u>; and

storing as a compressed file in a database the reference model and the difference between the predicted offset vertex and actual offset vertex for each subsequent frame of the animation cycle.

Claim 22 (original): The method of claim 21, wherein at least one basis coordinate system comprises a set of vertices that are either seed vertices or vertices previously traversed.

Claim 23 (original): The method of claim 21, wherein at least one basis coordinate system is a triangle defined by three vertices nearby the reference vertex.

Claim 24 (original): The method of claim 21, wherein at least one basis coordinate system comprises a preconfigured triangle based on a location of the reference vertex.

Claim 25 (original): The method of claim 21, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i,k-1}$, $P_{i+1,k-1}$, $P_{i+1,k-2}$ where the reference vertex is $P_{i,k}$, and is in an odd row of the surface.

Claim 26 (original): The method of claim 21, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i,k-1}$, $P_{i,k-2}$, where the reference vertex is $P_{i,k}$, and is in an even row of the surface.

Claim 27 (original): The method of claim 21, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i-1,k}$, $P_{i-2,k}$, where the reference vertex is $P_{i,k}$, and is in a last row of the surface.

Claim 28 (original): The method of claim 21, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k}$, $P_{i,k+1}$, $P_{i-2,k+1}$, where the reference vertex is $P_{i,k}$, and is the leftmost vertex in a last and odd row of the surface.

Claim 29 (original): The method of claim 21, wherein predicting the offset vertex comprises:

determining a reference vector for the position of the reference vertex in the basis coordinate system on the reference model; and

determining a corresponding offset vector for the reference vertex in the basis coordinate system of the offset model.

Claim 30 (original): The method of claim 21, wherein predicting the offset vertex comprises determining the offset vertex $P'_{i,k}$ from the equation:

$$\vec{P'}_{i,k} = \left(\vec{P}_{i,k} - \vec{A}\right) * \begin{bmatrix} \vec{s} \\ \vec{t} \\ \vec{r} \end{bmatrix}^{-1} \begin{bmatrix} \vec{s'} \\ \vec{t'} \\ \vec{r'} \end{bmatrix} + \vec{A'}$$

where:

$P_{i,k}$ is the reference vertex in the world space of the reference model;

A, B, C are vertices of the basis coordinate system in the world space of the reference model, and

s=B-A, t=C-A, and r is normal to s and t, and has a length equal to the average length of s and t;

A', B', C' are vertices of the basis coordinate system in the world space of the offset model, and

s'=B'-A', t'=C'-A', and r' is normal to s' and t', and has a length equal to the average length of s' and t'.

Claim 31 (original): The method of claim 1, further comprising:

selecting seed vertices; and

quantizing the seed vertices.

Claim 32 (original): The method of claim 21, wherein traversing a plurality of reference vertices comprises traversing the reference vertices in a zig-zag pattern.

Claim 33 original): The method of claim 21, wherein traversing a plurality of reference vertices comprises traversing the reference vertices in a zig-zag pattern between adjacent rows of reference vertices.

Claim 34 (original): The method of claim 21, wherein traversing a plurality of reference vertices comprises traversing the surface of the reference model in a hierarchical traversal pattern.

Claim 35 (original): The method of claim 21, wherein traversing a plurality of reference vertices comprises traversing the surface of the reference model in a triangle-based traversal pattern.

Claim 36 (original): The method of claim 21, wherein storing the difference between the predicted offset vertex and actual offset vertex comprises quantizing the difference before storing.

Claim 37 (original): The method of claim 21, wherein storing the difference between the predicted offset vertex and actual offset vertex comprises reordering vector components of the difference so that vector components associated with each axis are stored contiguously.

Claim 38 (original): The method of claim 21, wherein storing the difference between the predicted offset vertex and actual offset vertex comprises compressing the difference into a compressed data set using an entropy based compression algorithm.

Claim 39 (original): The method of claim 21, further comprising compressing seed vertices using an entropy based compression algorithm.

Claim 40 (currently amended): A computer implemented method for decompressing a compressed animation model file for an animation cycle comprising a plurality of frames of animation of the animation model, the model representing an offset model including a plurality of surfaces, each surface including a plurality of vertices, the method comprising:

predicting offset vertices of the offset model from corresponding reference vertices of a reference model for a first frame of the animation cycle and associated with the offset model, using basis coordinate systems respectively associated with the reference vertices;

retrieving from a database the compressed animation model file, previously stored differences between the predicted offset vertices and actual offset vertices of the offset model for each subsequent frame of the animation cycle; and

combining the predicted offset vertices and the retrieved differences to produce the offset vertices of the offset model for each subsequent frame of the animation cycle.

Claim 41 (original): The method of claim 40, wherein at least one basis coordinate system comprises a set of vertices that are either seed vertices or vertices previously traversed.

Claim 42 (original): The method of claim 40, wherein at least one basis coordinate system is a triangle defined by three vertices nearby the reference vertex.

Claim 43 (original): The method of claim 40, wherein at least one basis coordinate system comprises a preconfigured triangle based on a location of the reference vertex.

Claim 44 (original): The method of claim 40, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i,k-1}$, $P_{i+1,k-1}$, $P_{i+1,k-2}$ where the reference vertex is $P_{i,k}$, and is in an odd row of the surface.

Claim 45 (original): The method of claim 40, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i,k-1}$, $P_{i,k-2}$, where the reference vertex is $P_{i,k}$, and is in an even row of the surface.

Claim 46 (original): The method of claim 40, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i-1,k}$, $P_{i-2,k}$, where the reference vertex is $P_{i,k}$, and is in a last row of the surface.

Claim 47 (original): The method of claim 40, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k}$, $P_{i,k+1}$, $P_{i-2,k+1}$, where the reference vertex is $P_{i,k}$, and is the leftmost vertex in a last and odd row of the surface.

Claim 48 (original): The method of claim 40, wherein predicting offset vertices comprises for each offset vertex:

selecting a reference vertex on the reference model and a corresponding offset vertex;

selecting a basis coordinate system on the reference model with respect to the reference vertex, the basis coordinate system defined by vertices nearby the reference vertex, the basis coordinate system providing the basis coordinates for the reference vertex;

selecting a basis coordinate system on the offset model;

determining a position of the reference vertex in the basis coordinate system; and

predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model.

Claim 49 (original): The method of claim 48, wherein predicting the offset vertex, comprises:

determining a reference vector for the position of the reference vertex in the basis coordinate system on the reference model; and

determining a corresponding offset vector for the reference vertex in the basis coordinate system of the offset model.

Claim 50 (original): The method of claim 48, wherein predicting the offset vertex, comprises determining the offset vertex $P'_{i,k}$ from the equation:

$$\vec{P'}_{i,k} = \left(\vec{P}_{i,k} - \vec{A}\right) * \begin{bmatrix} \vec{s} \\ \vec{t} \\ \vec{r} \end{bmatrix}^{-1} \begin{bmatrix} \vec{s}' \\ \vec{t}' \\ \vec{r}' \end{bmatrix} + \vec{A}'$$

where:

$P_{i,k}$ is the reference vertex in the world space of the reference model;

A, B, C are vertices of the basis coordinate system in the world space of the reference model, and

s=B-A, t=C-A, and r is normal to s and t, and has a length equal to the average length of s and t;

A', B', C' are vertices of the basis coordinate system in the world space of the offset model, and

s'=B'-A', t'=C'-A', and r' is normal to s' and t', and has a length equal to the average length of s' and t'.

Claim 51 (original): The method of claim 40, wherein retrieving from the compressed animation model stored differences comprises:

reordering vector components of the differences from being continuously stored for each axis of a coordinate system to being grouped into coordinate tuple form.

Claim 52 (original): The method of claim 40, retrieving from the compressed animation model stored differences comprises decompressing the differences into an uncompressed form using an entropy based decompression algorithm.

Claim 53 (original): The method of claim 40, further comprising decompressing seed vertices into an uncompressed form using an entropy based decompression algorithm, and using the seed vertices as a reference vertices.

Claim 54 (original): The method of claim 40, wherein predicting offset vertices comprises traversing the surface of the reference model in a zig-zag pattern.

Claim 55 (original): The method of claim 40, wherein predicting offset vertices comprises traversing the surface of the reference model in a hierarchical traversal pattern.

Claim 56 (original): The method of claim 40, wherein predicting offset vertices comprises traversing the surface of the reference model in a triangle based traversal pattern.

Claim 57 (currently amended): A <u>computer implemented</u> method for decompressing a compressed animation model <u>file for an animation cycle comprising a plurality of frames of animation of the animation model</u>, the model representing an offset model including a plurality of surfaces, each surface including a plurality of vertices, the method comprising:

traversing a plurality of reference vertices on a surface of a reference model <u>for a first frame of the animation cycle and</u> associated with the offset model, and for each reference vertex:

retrieving from <u>a database for</u> the compressed animation model <u>file</u> a <u>previously</u> stored difference between a predicted offset vertex and an actual offset vertex of the offset model <u>for each subsequent frame of the animation cycle</u>;

selecting a basis coordinate system on the reference model with respect to the reference vertex, the basis coordinate system defined by vertices nearby the reference vertex, the basis coordinate system providing the basis coordinates for the reference vertex;

selecting a basis coordinate system on the offset model;

determining a position of the reference vertex in the basis coordinate system on the reference model;

predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model; and

combining the predicted, offset vertex and the retrieved difference to produce a final offset vertex of the offset model for each subsequent frame of the animation cycle.

Claim 58 (original): The method of claim 57, wherein at least one basis coordinate system comprises a set of vertices that are either seed vertices or vertices previously traversed.

Claim 59 (original): The method of claim 57, wherein at least one basis coordinate system is a triangle defined by three vertices nearby the reference vertex.

Claim 60 (original): The method of claim 57, wherein at least one basis coordinate system comprises a preconfigured triangle based on a location of the reference vertex.

Claim 61 (original): The method of claim 57, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i,k-1}$, $P_{i+1,k-1}$, $P_{i+1,k-2}$ where the reference vertex is $P_{i,k}$, and is in an odd row of the surface.

Claim 62 (original): The method of claim 57, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i,k-1}$, $P_{i,k-2}$, where the reference vertex is Pi k, and is in an even row of the surface.

Claim 63 (original): The method of claim 57, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k-1}$, $P_{i-1,k}$, $P_{i-2,k}$, where the reference vertex is Pi k, and is in a last row of the surface.

Claim 64 (original): The method of claim 57, wherein at least one basis coordinate system comprises a triangle defined by the vertices $P_{i-1,k}$, $P_{i,k+1}$, $P_{i-2,k+1}$, where the reference vertex is $P_{i,k}$, and is the leftmost vertex in a last and odd row of the surface.

Claim 65 (original): The method of claim 57, wherein predicting the offset vertex, comprises:

determining a reference vector for the position of the reference vertex in the basis coordinate system on the reference model; and

determining a corresponding offset vector for the reference vertex in the basis coordinate system of the offset model.

Claim 66 (original): The method of claim 57, wherein predicting the offset vertex, comprises determining the offset vertex $P'_{i,k}$ from the equation:

$$\vec{P'}_{i,k} = \left(\vec{P}_{i,k} - \vec{A}\right) * \begin{bmatrix} \vec{s} \\ \vec{t} \\ \vec{r} \end{bmatrix}^{-1} \begin{bmatrix} \vec{s}' \\ \vec{t}' \\ \vec{r}' \end{bmatrix} + \vec{A}'$$

where:

$P_{i,k}$ is the reference vertex in the world space of the reference model;

A, B, C are vertices of the basis coordinate system in the world space of the reference model, and

s=B-A, t=C-A, and r is normal to s and t, and has a length equal to the average length of s and t;

A', B', C' are vertices of the basis coordinate system in the world space of the offset model, and

s'=B'-A', t'=C'-A', and r' is normal to s' and t', and has a length equal to the average length of s' and t'.

Claim 67 (original): The method of claim 57, wherein retrieving from the compressed animation model a stored difference comprises:

reordering vector components of the difference from being continuously stored for each axis of a coordinate system to being grouped into coordinate tuple form.

Claim 68 (original): The method of claim 57, wherein retrieving from the compressed animation model a stored difference comprises decompressing the difference into an uncompressed form using an entropy based decompression algorithm.

Claim 69 (original): The method of claim 57, further comprising decompressing a seed vertex into an uncompressed form using an entropy based decompression algorithm, and using the seed vertex as a reference vertex.

Claim 70 (original): The method of claim 57, wherein traversing a plurality of reference vertices comprises traversing the surface of the reference model in a zig-zag pattern.

Claim 71 (original): The method of claim 57, wherein traversing a plurality of reference vertices comprises traversing the surface of the reference model in a hierarchical traversal pattern.

Claim 72 (original): The method of claim 57, wherein traversing a plurality of reference vertices comprises traversing the surface of the reference model in a triangle-based traversal pattern.

Claim 73 (currently amended): A computer program product, comprising a computer readable medium carrying code for storing as a compressed file in a database a compressed, offset animation model file for an animation cycle comprising a plurality of frames of animation of the animation model, the model comprising:

a plurality of seed vertices, each seed vertex corresponding to a row of reference vertices on a surface of a reference model for a first frame of the animation cycle and associated with the offset model, the seed vertices for predicting a plurality of offset vertices on a surface of the offset model; and

a plurality of differences between predicted offset vertices and actual offset vertices for each subsequent frame of the animation cycle, for combining with the plurality of offset vertices

predicted from the seed vertices to produce a plurality of final offset vertices on the surface of the offset model <u>for each subsequent frame of the animation model</u>.

Claim 74 (original): The computer program product of claim 73, wherein the seed vertices are stored in quantized form.

Claim 75 (original): The computer program product of claim 73, wherein the differences are stored in quantized form.

Claim 76 (original): The computer program product of claim 73, wherein the differences comprise vector components of coordinate tuples, and the vector components for each axis of a coordinate system are stored continuously.

Claim 77 (original): The computer program product of claim 73, wherein the seed vertices are stored in compressed form from an entropy based compression algorithm.

Claim 78 (original): The computer program product of claim 73, wherein the differences are stored in compressed, form from an entropy-based compression algorithm.

Claim 79 (currently amended): A system for compressing an animation model <u>for an animation cycle comprising a plurality of frames of an animation cycle of the animation model</u>, the model comprising an offset model including a plurality of surfaces, each surface including a plurality of vertices, the system comprising:

a model database that stores a reference model <u>for a first frame of the animation cycle</u>; and

a geometry compression module that predicts offset vertices of the offset model for corresponding reference vertices of the reference model associated with the offset model, using basis coordinate systems respectively associated with the reference vertices, determines differences between the predicted offset vertices and actual offset vertices of the offset model <u>for each subsequent frame of the animation cycle</u>, and stores the <u>reference model and</u> differences between the predicted offset vertices and actual offset vertices as a compressed offset model in the model database to allow reconstruction of the actual offset vertices using the reference vertices and the differences.

Claim 80 (original): The system of claim 79, further comprising:

a quantization module that quantizes the differences prior to storing in the compressed offset model.

Claim 81 (original): The system of claim 79, each difference comprises a vector having vector components, each vector component associated with an axis of a coordinate system, the system further comprising:

a data reordering module that reorders the vector components of the differences so that vector components associated with each axis are stored contiguously.

Claim 82 (original): The system of claim 79, further comprising:

a data compression module that compresses the differences using an entropy based compression algorithm prior to storing in the compressed offset model.

Claim 83 (original): The system of claim 79, wherein the geometry compression module predicts offset vertices by:

selecting a reference vertex on the reference model and a corresponding offset vertex;

selecting a basis coordinate system on the reference model with respect to the reference vertex, the basis coordinate system defined by vertices nearby the reference vertex, the basis coordinate system providing the basis coordinates for the reference vertex;

selecting a basis coordinate system on the offset model;

determining a position of the reference vertex in the basis coordinate system; and

predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model.

Claim 84 (currently amended): A system for decompressing a compressed animation model for an animation cycle comprising a plurality of frames of animation of the animation model, the model representing an offset model including a plurality of surfaces, each surface including a plurality of vertices, the system comprising:

a model database that stores a reference model for a first frame of the animation model and a compressed animation model; and

a geometry decompression module that predicts offset vertices of the offset model from corresponding reference vertices of the reference model associated with the offset model for each subsequent frame of the animation cycle, using basis coordinate systems respectively associated with the reference vertices, retrieves from the compressed animation model stored differences between the predicted offset vertices and actual offset vertices of the offset model, and combines the predicted offset vertices and the stored differences to produce the offset vertices of the offset model for each subsequent frame of the animation cycle.

Claim 85 (original): The system of claim 84, further comprising:

a data decompression module that decompresses the stored differences using an entropy based decompression algorithm.

Claim 86 (original): The system of claim 84, further comprising:

a data reordering module that reorders vector components of the differences from being continuously stored for each axis of a coordinate system to being grouped into coordinate tuple form.

Claim 87 (original): The system of claim 84, wherein the geometry decompression module predicts offset vertices by:

selecting a reference vertex on the reference model and a corresponding offset vertex;

selecting a basis coordinate system on the reference model with respect to the reference vertex, the basis coordinate system defined by vertices nearby the reference vertex, the basis coordinate system providing the basis coordinates for the reference vertex;

selecting a basis coordinate system on the offset model;

determining a position of the reference vertex in the basis coordinate system; and

predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model.

Claim 88 (currently amended): A computer implemented method for compressing and decompressing an animation model file for an animation cycle comprising a plurality of frames of

animation for the animation model, the model comprising an offset model including a plurality of surfaces, each surface including a plurality of vertices, the method comprising:

predicting offset vertices of the offset model for corresponding reference vertices of a reference model for a first frame of the animation cycle and associated with the offset model, using basis coordinate systems respectively associated with the reference vertices;

determining differences between the predicted offset vertices and actual offset vertices of the offset model;

storing as a compressed file in a database the differences between the predicted offset vertices and actual offset vertices in a compressed animation model for each subsequent frame of the animation cycle;

retrieving from the database the compressed animation model file ~~the stored differences~~;

predicting offset vertices of the offset model from corresponding reference vertices of the reference model associated with the offset model for each subsequent frame of the animation cycle; and

combining the predicted offset vertices and the stored differences to produce the offset vertices of the offset model for each subsequent frame of the animation cycle.

Claim 89 (currently amended): A computer enabled method for compressing a file of an animation model for an animation cycle comprising a plurality of frames of animation of the animation model, the model comprising an offset model including a plurality of surfaces, each surface including a plurality of vertices, the method comprising:

compressing the animation model by compressing a geometric representation of the surface of the offset model for each frame subsequent to a first frame of the animation cycle at a first time with respect to a reference model for the first frame of the animation cycle at a second time earlier than the first time; and

storing as a compressed file in a database the compressed representation.

Claim 90 (currently amended): A computer enabled method for decompressing an animation model file for an animation cycle comprising a plurality of frames of animation of the

animation model, the model comprising an offset model including a plurality of surfaces, each surface including a plurality of vertices, the method comprising:

retrieving from a database a file of a compressed geometric representation of a surface of the offset model at a first time with respect to a reference model for a first frame of the animation cycle at a second time earlier than the first time; and

decompressing the compressed geometric representation file with respect to the reference model at the second time to produce the offset model at the first time for each subsequent frame of the animation cycle.

Claim 91 (currently amended): A computer enabled system for providing a file of a compressed animation model for an animation cycle comprising a plurality of frames of animation of the animation model, the system comprising:

a reference model for the animation cycle, the reference model comprising a geometric representation describing a surface of the model for a first frame of the animation cycle;~~ and~~

a plurality of compressed, offset animation models, each compressed offset animation model corresponding to a subsequent frame of the animation cycle, and comprising a compressed geometric representation of a surface of the offset model corresponding to the reference vertices; and

a database storing as a compressed file each of the compressed, offset animation models and the reference model.

Claim 92 (original): The system of claim 91, wherein:

the reference model comprises a plurality of reference vertices describing the surface of the model; and

each compressed, offset animation model further comprises:

a plurality of seed vertices, each seed vertex corresponding to a row of reference vertices of the reference model associated with the offset model, the seed vertices for predicting a plurality of offset vertices on a surface of the offset model; and

a plurality of differences between predicted offset vertices and actual offset vertices, for combining with the plurality of offset vertices predicted from the seed vertices to produce a plurality of final offset vertices on the surface of the offset model.

Claim 93 (canceled)

Claim 94 (canceled)

Claim 95 (canceled)

Claim 96 (canceled)

Claim 97 (canceled)

Claim 98 (canceled)

Claim 99 (canceled)

Claim 100 (canceled)

Claim 101 (canceled)